

TRANSMITTAL LETTER TO THE UNITED STATES ELECTED OFFICE (EO/US)(Entry Into U.S. National Phase Under Chapter II)

PCT/EP00/01065

10 FEBRUARY 2000

16 MARCH 1999

International Application No.

International Filing Date

Priority Date Claimed

BADGE-FREE CAN COATING

Invention Title

CHRISTIAN VOGT, PETER AMBROSI

Applicant in U.S.

for countries other than U.S., Applicant is W.R. Grace &amp; Co.-Conn.

BOX PCT

Commissioner for Patents

Washington, D C 20231

ATTENTION: EO/US

Sir:

I.

1. Applicant(s) herewith submits to the United States Elected Office (EO/US) the following items under 35 U.S.C. §371:
  - a. ☐ This express request to immediately begin national examination procedures (35 U.S.C. §371(f)).
  - b. ☒ The U.S. National Fee (35 U.S.C. §371(c)(1)) and other fees (37 CFR §1.492) as indicated below:

## CERTIFICATE OF EXPRESS MAILING [37 CFR §1.10]

I hereby certify that this correspondence is being deposited with the U.S. Postal Service Express Mail<sup>®</sup> Service on September 12, 2001, under Express Mail No. EL889098875US and is addressed to:  
BOX PCT, Commissioner for Patents, Washington, DC 20231.

Name: Craig K. Leon



Signature

September 12, 2001

Sig. Date

## 2. Fees

<b>A. CLAIMS FEE*</b>				
(1) For	(2) Number Filed	(3) Number Extra	(4) Rate	(5) Calculations
Total Claims	16 - 20 =	0	x \$18.00 =	\$0.00
Independent	1 - 3 =	0	x \$78.00 =	\$0.00
Multiple Dependent Claims (if any)		0	x \$260.00 =	\$0.00
Please Enter the Claim Amendments Before Calculating File Fees Claims Fee total =				\$0.00
<b>B. BASIC FEE</b>				
<input type="checkbox"/> USPTO WAS INTERNATIONAL PRELIMINARY EXAMINATION AUTHORITY Where an International Preliminary Examination Fee as set forth in §1.482 has been paid on the international application to the USPTO:				
<input type="checkbox"/> and the international preliminary examination report states that the criteria of novelty, inventive step (non-obviousness) and industrial activity, as defined in PCT Articles 33(1) to (4) have been satisfied for all the claims presented in the application entering the national stage (37 CFR §1.492(a)(4)).....				\$96.00
<input type="checkbox"/> and the above requirements are not met (37 CFR §1.492(a)(1)).....				\$670.00
<input checked="" type="checkbox"/> USPTO WAS NOT INTERNATIONAL PRELIMINARY EXAMINATION AUTHORITY Where no International Preliminary Examination Fee as set forth in §1.482 has been paid on the international application to the USPTO, and payment of an international search fee as set forth in §1.445(a)(2) to the USPTO:				
<input type="checkbox"/> has been paid (37 CFR §1.492(a)(2)).....				\$760.00
<input type="checkbox"/> has not been paid (37 CFR §1.492(a)(3)).....				\$970.00
<input checked="" type="checkbox"/> where a search report on the international application has been prepared by the European Patent Office or the Japanese Patent Office (37 CFR §1.492(a)(5)).....				\$840.00
<b>Basic Fee total =</b>				<b>\$840.00</b>
<b>C. SMALL ENTITY</b>				
<input type="checkbox"/> Reduction by 1/2 for filing by small entity, if applicable. Affidavit must also be filed (37 CFR §1.9, 1.27, 1.28)				\$
<b>Subtotal (A + B + C) =</b>				<b>\$840.00</b>
<b>Total National Fee =</b>				<b>\$840.00</b>
<input type="checkbox"/> Fee for recording the enclosed assignment document (37 CFR §1.21(h).) See attached "ASSIGNMENT COVER SHEET" .....				\$400.00
<b>TOTAL FEES ENCLOSED =</b>				<b>\$840.00</b>

\*[X] A Preliminary Amendment of claims is attached. Please enter the claim amendments before computing the fees.

- i. ☐ A check in the amount of \$\_\_\_\_\_ to cover the above fees is enclosed.
- ii. ☒ Please charge my Deposit Account No. 07-1756 in the amount of \$840.00. Triplicate copies of this sheet are enclosed.

518 Rec'd PCT/PTO 12 SEP 2001

## 2. Fees

<b>A. CLAIMS FEE*</b>				
(1) For	(2) Number Filed	(3) Number Extra	(4) Rate	(5) Calculations
Total Claims	16 - 20 =	0	× \$18.00 =	\$0.00
Independent	1 - 3 =	0	× \$78.00 =	\$0.00
Multiple Dependent Claims (if any)		0	× \$260.00 =	\$0.00
Please Enter the Claim Amendments Before Calculating File Fees Claims Fee total =				\$0.00
<b>B. BASIC FEE</b>				
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<input type="checkbox"/> and the international preliminary examination report states that the criteria of novelty, inventive step (non-obviousness) and industrial activity, as defined in PCT Articles 33(1) to (4) have been satisfied for all the claims presented in the application entering the national stage (37 CFR §1.492(a)(4)).....				\$96.00
<input type="checkbox"/> and the above requirements are not met (37 CFR §1.492(a)(1)).....				\$670.00
<input checked="" type="checkbox"/> USPTO WAS NOT INTERNATIONAL PRELIMINARY EXAMINATION AUTHORITY Where no International Preliminary Examination Fee as set forth in §1.482 has been paid on the international application to the USPTO, and payment of an international search fee as set forth in §1.445(a)(2) to the USPTO:				
<input type="checkbox"/> has been paid (37 CFR §1.492(a)(2)).....				\$760.00
<input type="checkbox"/> has not been paid (37 CFR §1.492(a)(3)).....				\$970.00
<input checked="" type="checkbox"/> where a search report on the international application has been prepared by the European Patent Office or the Japanese Patent Office (37 CFR §1.492(a)(5)).....				\$840.00
<b>Basic Fee total =</b>				<b>\$840.00</b>
<b>C. SMALL ENTITY</b>				
<input type="checkbox"/> Reduction by 1/2 for filing by small entity, if applicable. Affidavit must also be filed (37 CFR §1.9, 1.27, 1.28)				\$
<b>Subtotal (A + B + C) =</b>				<b>\$840.00</b>
<b>Total National Fee =</b>				<b>\$840.00</b>
<input type="checkbox"/> Fee for recording the enclosed assignment document (37 CFR §1.21(h). See attached "ASSIGNMENT COVER SHEET" .....				\$40.00
<b>TOTAL FEES ENCLOSED =</b>				<b>\$840.00</b>

\*[X] A Preliminary Amendment of claims is attached. Please enter the claim amendments before computing the fees.

- i. ☐ A check in the amount of \$\_\_\_\_\_ to cover the above fees is enclosed.
- ii. ☒ Please charge my Deposit Account No. 07-1756 in the amount of \$840.00. Triplicate copies of this sheet are enclosed.

3. [x] A copy of the international application as filed (35 U.S.C. §371(c)(2)):
- a. [x] is transmitted herewith.
  - b. [ ] is not required, as the application was filed with the United States Receiving Office.
  - c. [x] has been transmitted
    - i. [x] by the International Bureau.  
Mailing date of the application (from form PCT/1B/308  
21 September 2000
    - ii. [ ] by applicant on (date) \_\_\_\_\_.
4. [x] A translation of the international application into the English language (35 U.S.C. §371(c)(2)):
- a. [ ] is transmitted herewith.
  - b. [x] is not required, as the application was filed in English.
  - c. [ ] was previously transmitted by applicant on (date) \_\_\_\_\_.
  - d. [ ] will follow.
5. [X] Amendments to the claims of the international application under PCT Article 19 (35 U.S.C. §371(c)(3)):
- a. [ ] is transmitted herewith.
  - b. [X] have been transmitted
    - i. [X] by the International Bureau.  
Mailing date of the application (from form PCT/1B/346):  
18 July 2000.
    - ii. [ ] by applicant on (date) \_\_\_\_\_.
  - c. [ ] have not been transmitted as
    - i. [ ] applicant chose not to make amendments under PCT Article 19.  
Date of mailing of Search Report (from form PCT/ISA/210):  
\_\_\_\_\_.
    - ii. [ ] the time limit for the submission of amendments has not yet expired. The amendments or a statement that amendments have not been made will be transmitted before the expiration of the time limit under PCT Rule 46.1.
6. [x] A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. §371(c)(3)):
- a. [ ] is transmitted herewith.
  - b. [x] is not required, as the amendments were made in the English language.
  - c. [ ] have not been transmitted for reasons indicated at point 5c above.

7. ☒ A copy of the international examination report (PCT/IPEA/409):
- ☒ is transmitted herewith.
  - ☐ is not required, as the application was filed with the United States Receiving Office.
8. ☐ Annex(es) to the international examination report (PCT/IPEA/409):
- ☐ is/are transmitted herewith.
  - ☐ is/are not required, as the application was filed with the United States Receiving Office.
9. ☐ A translation of the annex(es) to the international examination report:
- ☐ is/are transmitted herewith.
  - ☐ is/are not required, as the annex(es) are in the English language.
10. ☒ A signed oath or declaration of the inventor complying with 35 U.S.C. §115:
- ☐ was previously submitted by applicant on (date) \_\_\_\_\_.
  - ☐ is submitted herewith, and such oath or declaration
    - ☐ is attached to the application.
    - ☐ identifies the application and any amendments under PCT Article 19 that were transmitted as stated in points 3b or 3c and 5b; and states that they were reviewed by the inventor(s) as required by 37 CFR §1.70.
    - ☒ will follow.

**II. Other document(s) or information included:**

11. ☒ An International Search Report (PCT/ISA/210) or Declaration under PCT Article 17(2)(a):
- ☒ is transmitted herewith.
  - ☐ has been transmitted by the International Bureau.  
Mailing date (from form PCT/1B/308):
  - ☐ is not required, as the application was searched by the United States International Searching Authority.
  - ☐ will be transmitted promptly upon request.
  - ☐ has been submitted by applicant(s) on (date) \_\_\_\_\_.
12. ☒ An Information Disclosure Statement under 37 CFR §§1.97 and 1.98:
- ☐ is transmitted herewith. Also transmitted herewith are:
    - Form PTO-1449.
    - Copies of citations listed.
  - ☒ will be transmitted within THREE MONTHS of the date of submission of requirements under 35 U.S.C. §371(c).

Attorney Docket No. L3669-01

- c. ☐ was previously submitted by applicant(s) on (date) \_\_\_\_\_.
13. ☐ An assignment document is transmitted herewith for recording.
- ☐ The assignment document was filed on \_\_\_\_\_, and Applicant encloses a copy herewith. Applicant has not received confirmation yet of assignment filing.
- A separate
- ☐ "Cover Sheet for Assignment (Document) Accompanying new Patent Application" or
- ☐ Form PTO-1595 is also attached.
- ☐ Please return the assignment document after recordation to
- W. R. Grace & Co.-Conn.  
Patent Department  
62 Whittemore Avenue  
Cambridge, Massachusetts 02140-1692
14. ☒ Additional documents:
- a. ☒ Copy of request (PCT/RO/101)
- b. ☐ International Publication No. \_\_\_\_\_.
- i. ☐ Specification and claims
- ii. ☐ Front page only
- c. ☒ Preliminary Amendment (37 CFR §1.121)
- d. ☒ Other
- Return Receipt Postcard
15. ☒ The above checked items are being transmitted:
- a. ☒ before 30 months from any claimed priority date.
- b. ☐ after 30 months.
16. ☐ Certain requirements under 35 U.S.C. §371 were previously submitted by the applicant(s) on \_\_\_\_\_, namely:
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

AUTHORIZATION TO CHARGE ADDITIONAL FEES

[x] The Commissioner is hereby authorized to charge the following additional fees that may be required by this paper and during the entire pendency of this application to Account No. 07-1756:

- i. [x] 37 CFR §1.492(a)(1), (2), (3), and (4) (*filing fees*)
- ii. [x] 37 CFR §1.492(b), (c), and (d) (*presentation of extra claims*)
- iii. [x] 37 CFR §1.17 (*application processing fees*)
- iv. [ ] 37 CFR §1.492(b), (c), and (d) (*issue fee at or before mailing of Notice of Allowance, pursuant to 37 CFR §1.311(b)*)
- v. [x] 37 CFR §1.492(e) and (f) (*surcharge fees for filing the declaration and/or filing an English translation of an International Application later than 30 months after the priority date*).

Authorization is given to charge our Deposit Account No. 07-1756 for any required fees or expenses due under 37 C.F.R. §1.53.

Respectfully submitted,



Craig K. Leon  
Attorney for Applicant  
Registration No. 33,293

Date: September 12, 2001  
62 Whittemore Avenue  
Cambridge, Massachusetts 02140-1692  
Tel. (617) 498-4584

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Christian Vogt and Peter Ambrosi

Examiner: (not yet assigned)

Serial No.: (not yet assigned) based on International

Application No. EP00/01065

Filed: Herewith (based on International Filing Date of March 16, 1999)

Group Art Unit: (not yet assigned)

For: BADGE-FREE CAN COATING

PRELIMINARY AMENDMENT**BOX PCT**

COMMISSIONER FOR PATENTS

Washington, DC 20231

Applicants submit the following amendment in the above-referenced application, which is a national application under Section 371 based on International (PCT) Application Serial No. EP00/01065, as follows:

In the Claims

*Please cancel claim 4 without prejudice, and amend claim 1 to read as follows:*

1. (As Amended) A coating composition for metal capable of being formed into a container, said coating composition comprising:

- a) a polyester resin in the amount of 20-50% by wt., said polyester resin comprising trimethylolpropane in the amount of 0.1-10% by wt., neopentylglycol in the amount of 15-30% by wt., at least one other polyol in the amount of 5-20% by wt., a phthalic acid in the amount of 20-60% by wt., and adipic acid in the amount of 10-35% by wt.;
- b) a resol resin in the amount of 1-15% by wt. and comprising a condensation product made from a phenol or homologue thereof and formaldehyde; and
- c) a solvent component in the amount of 35-79% by wt., all foregoing weight percentages being based on the total weight of the coating composition; and

the coating composition being substantially free of bisphenol-A-diglycidyl ether, bisphenol-F-diglycidyl ether, homologues thereof, and polyvinyl chloride.



REMARKS

Claim 1 is amended to incorporate the features set forth in claim 4 as originally filed. The amendments are shown in the bracketed/interlineated version of claim 1 attached hereto as Exhibit A.

Claim 4 is cancelled without prejudice.



Craig K. Leon  
Attorney for Applicants  
Registration No. 33,293

Date: September 12, 2001  
62 Whittemore Avenue  
Cambridge, Massachusetts 02140  
Tel. (617) 498-4584

CK1\RESP\36699PREL.DOC

CERTIFICATE OF MAILING (37 CFR §1.10)

I hereby certify that this correspondence is being deposited with the Express Mail Service of the United States Postal Service, prepaid, under #EL889098875US, in an envelope addressed to: *Box PCT, Commissioner for Patents, Washington, D.C. 20231* on September 12, 2001.



Craig K. Leon, Esq.

September 12, 2001  
Signature Date

EXHIBIT A

1. (Amended) A coating composition for metal capable of being formed into a container, said coating composition comprising:

- d) a polyester resin in the amount of 20-50% by wt., said polyester resin comprising trimethylolpropane in the amount of 0.1-10% by wt., neopentylglycol in the amount of 15-30% by wt., at least one other polyol in the amount of 5-20% by wt., a phthalic acid in the amount of 20-60% by wt., and adipic acid in the amount of 10-35% by wt.;
- e) a resol resin in the amount of 1-15% by wt. and comprising a condensation product made from a phenol or homologue thereof and formaldehyde; and
- f) a solvent component in the amount of 35-79% by wt., all foregoing weight percentages being based on the total weight of the coating composition; and

the coating composition being substantially free of bisphenol-A-diglycidyl ether, bisphenol-F-diglycidyl ether, homologues thereof, and polyvinyl chloride.

BADGE-FREE CAN COATING

*Inventors: Christian Vogt and Peter Ambrosi*

Background of the Invention

10 Metal containers for receiving foods and beverages generally have one  
or more coatings to prevent contact between the filled product and metal.  
This is to prevent or minimize corrosion to the metal by the product and any  
disadvantageous influences on the quality of the product. For producing  
containers of this type, such as steel or tin cans, metal sheets are used which,  
prior to their shaping (such as for three-piece can production) or deformation  
15 (such as for deep drawing process), are coated with suitable coating  
compositions. In producing cans for foods and beverages, coatings are  
required which are extremely flexible and have a low order of toxicity.

Epoxy phenolic type coatings have been applied as lacquers onto metal  
can stock (e.g., for three-piece cans) and baked to provide coatings having  
20 good resistance to aggressive filled products, mechanical performance and  
metal adhesion. However, many of these incorporate 2,2'-bis(4-  
hydroxyphenyl) propane-bis(2,3-epoxypropyl)-ether (or homologues thereof,  
otherwise known as bisphenol-A-diglycidyl-ether or "BADGE" (Bisphenol-  
A-DiGlycidyl-Ether).

25 One objective of the present invention is to provide a novel can coating  
which is substantially free of BADGE (and BADGE-type components).  
BADGE-containing formulations do not meet approval in some countries for  
use in food canning. Currently available polyester type coatings, such as  
those cross-linked with amino-type or isocyanate-type resins, are used on the  
30 exterior of three-piece cans, but do not resist processing when in contact with  
food, or do not comply with food laws, and therefore do not yet provide an  
alternative coating formulation. In view of the foregoing disadvantages of the  
prior art, a novel can coating is need which is substantially BADGE-free (and  
PVC-free as well).

### Summary of the Invention

In surmounting the disadvantages of the prior art, the present invention provides a coating for metal sheet substrates, such as metal cans or metal can stock, which is substantially BADGE-free.

Another objective of the present invention to provide a coating which is substantially free of polyvinyl chloride (PVC).

A further objective of the invention is to provide metal can coatings that have suitable flexibility and are safe when processed in contact with food. The coatings should be suitable for three-piece cans as well as deep-drawn metal cans.

An exemplary coating of the invention comprises (a) a polyester resin (20-50% wt.); (b) a resol resin (1-15% wt.); and (c) a solvent component (35-79% wt.), all weight percentages based on total coating weight, the coating being substantially free of bisphenol-A-diglycidyl-ether and bisphenol-F-diglycidyl ether (e.g., "BADGE" or "BADGE-type" components), and preferably also substantially free of polyvinyl chloride. In further preferred embodiments, the coating comprises a lubricant (0.1-2% wt.) and acid catalyst (0-2% wt.).

Further advantages and features of the present invention are discussed hereinafter.

### Detailed Description of the Invention

All weight percentages provided herein are based on the total weight of the coating composition including solvent.

As summarized above, exemplary coating compositions of the invention comprise: (a) a polyester resin in the amount of 20-50% wt.; (b) a resol resin in the amount of 1-15% wt. and comprising a condensation product made from a phenol or homologue thereof and formaldehyde; and (c) a solvent in the amount of 35-79% wt., all weight percentages being based on the total weight of said coating, the coating compositions being substantially

5 free of bisphenol-A-diglycidyl-ether ("BADGE") and bisphenol-F-diglycidyl ether (a "BADGE-type" component).

The phrase "substantially free" as used within the context of this application means that the coating compositions of the invention have no BADGE, BADGE-type component, or PVC, or at least no more than a de  
10 minus amount of these components, e.g., less than 0.001% by total wt..

An exemplary polyester resin component of the invention comprises (a) trimethylolpropane in the amount of 0.1-10% wt. and more preferably 1-7% wt.; neopentylglycol in the amount of 15-30% wt. and more preferably 20-25% by wt.; at least one other polyol (e.g., ethylene glycol, propylene glycol)  
15 in the amount of 5-20% wt. and more preferably 10-15% wt.; phthalic acid (including iso- and tere-) in the amount of 20-60% wt. and more preferably 20-25% wt.; and adipic acid in the amount of 10-35% wt. and more preferably 15-20% wt. A commercially available polyester resin, available from DSM Resins of Zwolle, The Netherlands under the tradename URALAC XP 8481 SN, is  
20 believed to be suitable for use as polyester resin component (a) in the present invention.

Resol resin component (b) may be characterized as a condensation resin made from a phenol or phenolic homologue (phenol, butyl phenol, cresol, xlenol, Bisphenol A) and formaldehyde. Preferably, the resol resin  
25 comprises Bisphenol A, butyl phenol, xlenol, or a mixture thereof, and formaldehyde. Commercially available resol resins believed to be suitable for use in the present invention are available from Vianova Resins, Germany, under the tradename PHENODUR PR 401 and from Deutsche Shell Chemie, Germany, under the tradename EPICURE DX 200.

30 The resins can be solvated in a solvent or solvent mixture, for example, n-butanol and/or butylcellusolve, or other conventional solvents used for can coatings. The resin can be etherified with an alcohol (e.g., butanol) and solvated in the solvent or solvent mixture. Other known solvents that can be used for solvating the polyester and resol resins include aromatic  
35 hydrocarbons (e.g., aromatic 100 or aromatic 150), glycolether/glycolether

5 acetate (e.g., methoxypropanol butylcellulosolveacetate, methoxypropylacetate,), alcohols (e.g., isobutanol, diacetone alcohol), ketons (e.g., methylisobutylketon, isophorone) or esters (e.g., butyl acetate, dibasic esters). In other exemplary coating compositions of the invention, at least two different solvents are used, preferably having different boiling ranges.

10 Preferably, the coating composition further comprises a lubricant which is in a solid form dispersed in solvent. The lubricant may be present in the coating composition in the amount of 0.1-2% wt., and more preferably 0.1-1% wt. Exemplary lubricants may comprise polyethylene (PE), polypropylene (PP), PTFE, lanoline, carnauba wax and petrolatum.  
15 Preferably, the lubricant comprises PE, PP or PTFE or a mixture of these.

Preferred coating compositions also comprise at least one catalyst, preferably an acidic catalyst, such as sulfonic acid (e.g., paratoluene sulfonic acid and dodecyl benzenesulfonic acid), phosphoric acid and phosphoric acid ester (e.g., phosphoric acid monobutyl ester), in the amount of 0.05-2.0% wt.,  
20 and more preferably in the amount of 0.05-1.0% wt.

Accordingly, a preferred coating composition of the invention comprises polyester resin (solid) (20-50% wt); resol resin (solid) (1-15% wt); a lubricant (solid) (0.1-2% wt); an acidic catalyst (0-2% wt); and a solvent (35-79% wt), all percentages based on the total weight of the coating composition.

25 The coating may be applied to a metal substrate or metal plate for a can, such as by roller coating or spray coating, or it may be applied by these means to a formed can. Preferred application is by roller coating to the flat metal before formation of the can. Preferred coating layer weights are 2-15 gsm (grams/square meter), and more preferably 3-8 gsm. After application,  
30 the coating should be cured at 180°C - 210°C, and more preferably at 190°C - 205°C for 6 to 20 minutes, and more preferably 8-13 minutes.

Example 1

An exemplary can coating composition of the invention may be prepared and applied as follows. A coating batch may be formulated as follows, using a blender that can mix the following components into a sufficiently homogeneous composition. The polyester resin, comprising trimethylolpropane, neopentylglycol, and other polyols, as previously discussed, is preferably added first into the blender in the amount of 40-85% wt and more preferably 69-80% wt (based total weight of coating composition). The polyester resin was URALAC XP 8481 SN (from DSM Resins) which was solvated in a solvent mixture that comprised SOLVESSO 150 and butyl cellosolve (which solvents were used in a 4:1 weight ratio). SOLVESSO 150 aromatic hydrocarbon solvent is available from Exxon Chemical, and is believed to have a boiling range of 186-210°C. Butyl cellosolve is otherwise known as butyl glycole (e.g., ethylene glycol mono butyl ether).

Thus, once the polyester resin is introduced into the blender, then the other components can be introduced thereafter during mixing, as follows:

Preferred Range % (total weight)	More Preferred Range % (total weight)	Component	Description of Component
40-85	60-80	Polyester Resin	URALAC XP 8481 (which is about 50% resin components in Solvesso 150/Butyl Cellosolve 4:1)
4-25%	6-15%	Resol Resin	PHENODUR PR 401, 70% in butanol
0-25%	3-8%	methoxy propyl acetate	optional additional solvent
0-25%	3-8%	butyl cellosolve acetate	optional additional solvent
0-25%	3-10%	aromatic hydrocarbon solvent	optional additional solvent (e.g., SOLVESSO 100 from Exxon)
0-5%	0.5-2.0%	mixture of methoxy propanole and phosphoric acid	optional additional solvent wherein these components are preferably used 4:1
0.5-5.0%	0.8-3.0%	lubricant in solvent	lubricant such as PTFE (solid) can be used if solvated in solvents, e.g., SOLVESSO 100 and butyl cellosolve in 1:1:1 ratio

5 Exemplary lubricants which are suitable for use in the present invention are PFTE (polytetrafluoroethylene) modified with polyethylene wax, micronised (e.g., specially fine), and are available from Lanco Wax under the designations "TF 1780 EF." Also available from Lanco Wax is a polyethylene/polypropylene lubricant under the designation "PP 1350 FF" 10 which may also be suitable in the present invention. The lubricant, which is in solid form, should be mixed with a suitable solvent or solvents, such as SOLVESSO 100 (an hydrocarbon based solvent from Exxon) and butyl cellosolve, in amounts sufficient to prevent agglomeration of the lubricant in the mixture.

15 Once a homogeneous mixture of the coating components is obtained, this may be roller coated onto steel or aluminum can stock, for example, and baked at about 200°C for preferably 12-15 minutes. A BADGE-free can coating is thus obtained.

20 The foregoing discussion is provided by way of illustration only and is not intended to limit the scope of the invention as set forth in the claims.



## AMENDED CLAIMS

[received by the International Bureau on 12 July 2000 (12.07.00);  
original claims 1 and 6 replaced by amended claim 1; original claim 5 cancelled;  
remaining claims renumbered accordingly (3 pages)]

1. A coating composition for metal capable of being formed into a container, said coating composition comprising:

- a) a polyester resin in the amount of 20-50% by wt.;
- b) a resol resin in the amount of 1-15% by wt. and comprising a condensation product made from bisphenol A, butyl phenol, xylenol or a mixture thereof and formaldehyde; and
- c) a solvent component in the amount of 35-79% by wt., all foregoing weight percentages being based on the total weight of the coating composition; and

the coating composition being substantially free of bisphenol-A-diglycidyl ether, bisphenol-F-diglycidyl ether, homologues thereof, and polyvinyl chloride.

2. The coating composition of claim 1 further comprising at least one lubricant.
3. The coating composition of claim 2 wherein said lubricant comprises polyethylene, polypropylene, tetrafluor ethylene or a mixture of these.
4. The coating composition of any of claims 1-3 wherein said polyester resin comprises trimethylolpropane in the amount of 0.1-10% by wt., neopentylglycol in the amount of 15-30% by wt., at least one other polyol in the amount of 5-20% by wt., a phthalic acid in the amount of 20-60% by wt., and adipic acid in the amount of 10-35% by wt.

5. The coating composition of any of claims 1-4 wherein said solvent comprises an aromatic hydrocarbon, a glycolether/glycolether acetate, n-butanol, an aromatic hydrocarbon, a glycolether/glycolether acetate, an alcohol, an ester, or a mixture thereof.
6. The coating composition of any of claims 1-5 comprising: a polyester resin dispersed in a solvent (2-50% by wt.); a resol resin dissolved in a solvent (1-15% by wt.); a lubricant in solid form dispersed in at least one solvent (0.1-2% by wt.); an acidic catalyst (0-2% by wt.); and said solvent or solvents being operative to solvate said resins and lubricant; all percentages based on the total weight of the coating composition.
7. The coating compositions of claim 6 wherein said polyester and said resol resin are combined together using at least two different solvents.
8. The coating composition of any of claims 1-7 wherein said coating is coated onto a metal substrate.
9. The coating composition of claim 1 wherein said polyester resin comprises trimethylolpropane and neopentylglycol; said resol resin comprises a condensation resin made from bisphenol A, butyl phenol, xylenol or a mixture thereof and formaldehyde; at least one lubricant comprising polyethylene, polypropylene, PTFE, lanoline, carnauba wax, petrolatum, or a mixture thereof; and at least two different solvents.
10. The coating composition of claim 9 wherein at least one of the said two different solvents comprises an aromatic hydrocarbon type solvent.

11. The coating composition of any of claims 1-10 wherein said composition comprises at least two different solvents having different boiling ranges.
12. A coated metal substrate comprising a metal sheet having the coating composition of any of claims 1-11.
13. A coated can body having the coating composition according to any of claims 1-11.
14. The coating composition of claim 1 further comprising at least one catalyst.

**PATENT - ORIGINAL OR CIP**  
**DECLARATION AND POWER OF ATTORNEY**

As a below-named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name;

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural inventors are named below) of the subject matter which is claimed and for which a patent is sought on the invention entitled: Badge-Free Can Coating the specification of which

(check one)

☒ is attached hereto.

☐ was filed on \_\_\_\_\_ as Application Serial No. \_\_\_\_\_ and was amended on \_\_\_\_\_ (if applicable).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with 37 C.F.R. §1.56(a).

I hereby claim foreign priority benefits under 35 U. S. C. §119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

**PRIOR FOREIGN APPLICATION(S)**

NUMBER	COUNTRY	DAY/MONTH/YEAR FILED	PRIORITY CLAIMED	
			YES	NO
EP00/01065	PCT	10 FEBRUARY 2000		X
19912794.8	GERMANY	16 MARCH 1999	X	

I hereby claim the benefit under 35 U. S. C. §120 of any United States application(s) listed below, and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of 35 U. S. C. §112, I acknowledge the duty to disclose material information as defined in 37 C.F.R. §1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

APPLICATION SERIAL NO.	FILING DATE	STATUS (PATENTED, ABANDONED)	PENDING,

And I (we) hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith:

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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. §1001 and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Full name of sole or first Inventor: **Christian Vogt**

Inventor's signature: \_\_\_\_\_

Date: \_\_\_\_\_

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Attorney Docket No. E3609-01

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